REMARKS

The application has been carefully reviewed in light of the Examiner's action dated September 25, 2007. Claims 1, 6, 8-11, 14, 18, 20, 22, 25, and 30 have been amended. Reconsideration and full allowance are respectfully requested.

Initially, Applicant notes that the Examiner has rejected claims as being anticipated by, or unpatentable over U.S. Pat. App. 2005/0047620 (hereinafter the Fretz Publication). The Fretz Publication was published on March 3, 2005 and has a filing date of September 1, 2004. The Fretz Publication also claims priority to a U.S. Provisional Application No. 60/499,755 (hereinafter referred to as the '755 Application) filed on September 3, 2003. Applicant further notes that the present application was filed on April 9, 2004. As such, Applicant respectfully submits that only the subject matter disclosed in the '755 Application constitutes prior art with respect to the present application. Therefore, in the remarks that follow, Applicant makes reference to the subject matter disclosed in the '755 Application only. A copy of U.S. Provisional Application No. 60/499,755 will be provided at the Examiner's request.

In the September Action, the Examiner rejected Claims 1-2, 9, 12-14, 20, 23-26, and 33 under 35 U.S.C. 102(e) as being anticipated by the Fretz Publication. As set forth below, all the claims are believed to be allowable as currently presented, and therefore, this rejection is respectfully traversed. The above-noted claims include independent Claims 1, 14, and 25.

As presented, independent Claim 1 is directed to a method for reducing oscillation of a feedback signal in a hearing aid. The method includes determining a phase of a feedback signal over a feedback path of the hearing aid. The method further includes shifting the phase of an output signal of an implantable signal processor a predetermined amount, without modification of signal gain characteristics, to achieve a non-zero net phase of the feedback signal over the feedback path.

As set forth in the application, it has been recognized that, in implanted hearing aid devices, feedback signals may be provided over different propagation paths to the microphone and amplifier, such as via the eardrum and middle ear canal or the bones and/or other parts of the skull. The feedback signals are re-amplified by the amplifier, which may create an undesirable oscillation. As set forth in the Background section of the application, in order to compensate for the feedback signals, a filter (e.g., an FIR filter) may be used to calculate the best set of filter coefficients for reactively lowering the gain or power of the feedback signal. This method has the disadvantage of

limiting the actual output power available for the hearing aid, due to the fact that the closed loop gain should remain lower than 1 to avoid oscillation. Advantageously, the subject matter disclosed in Claim 1 proactively, as opposed to reactively, reduces the occurrence of oscillation of a feedback signal by shifting the phase of an output signal of an implantable signal processor a predetermined amount to achieve a non-zero net phase of the feedback signal over the feedback path. One specific advantage is that the system loop gain may be at levels at or above 1, without causing undesirable oscillation.

In contrast, the disclosure provided in the '755 Application uses an FIR filter to provide an internal feedback path that compensates for the feedback signals. See page 7, lines 10-17. As discussed above, the FIR filter is used to calculate the best set of filter coefficients for reactively lowering the gain or power of the feedback signal. To determine the coefficients in the feedback FIR filter, the invention disclosed in the '755 Application makes a small phase shift in the forward path of the system "as a means to measure the feedback path," rather than as a means to achieve a non-zero net phase of the feedback signal over the feedback path, as in the present application. That is, the phase shift is applied so that the system can determine if oscillating signals are due to feedback signals, or other sounds such as musical tones. See page 3, lines 1-3. The phase measurement is then used to adjust the FIR filter that is positioned in the internal feedback path. See page 3, lines 4-10, and Figure 2.

The '755 Application fails to disclose shifting the phase of an output signal of an implantable signal processor a predetermined amount, without modification of signal gain characteristics, to achieve a non-zero net phase of the feedback signal over the feedback path. As shown in Figure 2, the phase shifter that is introduced for measurement purposes is positioned at the input of the signal processor, whereas the phase shift disclosed in the method of Claim 1 is applied to an output signal of the signal processor. This distinction is significant because, as discussed above, phase shifting after processing to offset the feedback signal permits the system loop gain to be at a level at or above 1, without causing oscillation. Accordingly, as the '755 Application fails to disclose shifting the phase of an output signal of an implantable signal processor a predetermined amount, without modification of signal gain characteristics, to achieve a non-zero net phase of the feedback signal over the feedback path, Applicant submits that Claim 1 and its dependent claims are allowable as currently amended and respectfully requests that this rejection be withdrawn.

As presented, independent Claim 14 is directed to a method for reducing oscillation of a feedback signal over a feedback path in a hearing aid. The method includes monitoring the hearing aid for at least one of conditions favorable to oscillation of a feedback signal and oscillation of the feedback signal. The method also includes, responsive to detecting one of the conditions favorable for oscillation and oscillation of the feedback signal, determining the phase of the feedback signal. Furthermore, the method includes shifting the phase of an output signal of an implantable signal processor a predetermined amount, without modification of signal gain characteristics, to achieve a non-zero net phase of the feedback signal over the feedback path.

The '755 Application fails to disclose or suggest the method claimed by Claim 14. As discussed above in relation to Claim 1, The '755 Application does not disclose shifting the phase of an output signal of an implantable signal processor a predetermined amount, without modification of signal gain characteristics, to achieve a non-zero net phase of the feedback signal over the feedback path. Accordingly, as The '755 Application does not disclose the method of Claim 14, Applicant submits that Claim 14 and its dependent claims are allowable as currently amended and respectfully requests that this rejection be withdrawn.

As presented, independent Claim 25 is directed to a hearing aid that includes a microphone to receive audio inputs and provide a response signal. The hearing aid also includes an implantable signal processor to process the response signal to generate a transducer drive signal, wherein a portion of one of the response signal and the transducer drive signal is received over a feedback path as a feedback signal. Furthermore, the hearing aid includes a transducer to utilize the transducer drive signal to stimulate a component of the auditory system. The hearing aid also includes phase shifter logic to shift the phase of an output signal of the implantable signal processor a predetermined amount, without modification of signal gain characteristics, to achieve a non-zero net phase of the feedback signal over the feedback path.

As discussed above in relation to Claims 1 and 14, the '755 Application fails to disclose shifting the phase of an output signal of an implantable signal processor a predetermined amount, without modification of signal gain characteristics, to achieve a non-zero net phase of the feedback signal over the feedback path. As shown in Figure 2 of the '755 Application, the phase shifter that is introduced for measurement purposes is positioned at the input of the signal processor, whereas the phase shift disclosed in the method of Claim 25 is applied to an output signal of the signal processor. This distinction is significant because, as discussed above, phase shifting after processing to offset

the feedback signal permits the system loop gain to be at a level at or above 1, without causing oscillation. Accordingly, as the '755 Application fails to disclose shifting the phase of an output signal of an implantable signal processor a predetermined amount, without modification of signal gain characteristics, to achieve a non-zero net phase of the feedback signal over the feedback path, Applicant submits that Claim 25 and its dependent claims are allowable as currently amended and respectfully requests that this rejection be withdrawn.

The Examiner has also rejected Claims 10-11, 21-22, and 34-35 under 35 U.S.C. 103(a) as being unpatentable over the Fretz Publication. Applicant respectfully submits that the above-noted claims are dependent upon allowable claims, and as such are presently allowable.

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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